

REMARKS/ARGUMENTS

Status of the Application

Prior to the entry of this amendment, claims 1-15 were pending in this application. The Office Action rejected claims 14 and 15 under 35 U.S.C. § 101 for being directed to non-statutory subject matter, rejected claims 1-4, 10, 11, 13 and 14 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,853,604 to Spackman *et al.* (“Spackman”), in view of U.S. Patent No. 4,692,907 to Jubinski (“Jubinski”) and further in view of U.S. Patent No. 4,912,682 to Norton, Jr. *et al.* (“Norton”) and rejected the remaining claims of the application in view of Spackman, Jubinski, Norton and several additional references.

The present amendment amends claims 1 and 14. Therefore, claims 1-14 are presented for examination in this amendment. No new matter is added by the amendments to claims 1 and 14. Applicant respectfully requests reconsideration of this application as amended.

Claim objections

Claim 1, line 3 has been amended in line with the examiner’s suggestion to clarify that “electromechanical” and not “electrochemical” transducers are referred to.

35 U.S.C. §103 Rejections

In the Office Action claims 1-4, and 13 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Spackman in view of Jubinski and further in view of Oliver and rejected the remaining claims of the application in view of Spackman, Jubinski, Norton and further in view of several additional references. Applicant has amended the claims to clarify the claimed invention, not to change the scope of the claims. No new matter has been added by the amendments.

The currently independent claims of the present application include the feature that the claimed marine seismic survey system further includes means for correcting the vertical pressure gradient for the effect of rotation angle.

Applicants respectfully submit that the cited references, whether considered individually or in combination, do not teach the feature of correcting the vertical pressure

gradient for the effect of rotation angle. In fact, the Spackman and Jubinski references make no mention regarding determining an angle of rotation of pressure sensors in a marine cable at all, so do not even suggest that the vertical pressure gradient could be corrected for the effects thereof. Moreover, the Jubinski reference, like the references cited within it, actually teaches away from the feature of the independent claims of the present application of using transducers to determine the an angle of rotation of pressure sensors in a marine cable in that it teaches locking pressure sensors into a fixed orientation in a marine cable; the locked orientation of the pressure sensors being a constant the does not require any measurement of an angle of rotation.

The examiner states:

7. Jubinski teaches a group output being representative of the vertical pressure gradient (Col 3, lines 11-12). Spackman teaches sensing pressure variations. It would have been obvious based on the teachings of Jubinski that the pressure variations of Spackman could be a vertical pressure gradient. Furthermore it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the system of Spackman with the vertical pressure gradient of Jubinski since such a modification would have made it easier to separate upgoing and downgoing wavefields and thus aid in deghosting seismic data.

MPEP 2143.01(IV) states that: A mere statement that “the claimed invention would have been ‘well within the ordinary skill of the art at the time the claimed invention was made’ ... is not sufficient to establish a prima facie case of obviousness without some objective reason to combine the teaching of the references.”

The applicant respectfully submits that in the absence of any “articulated reasoning with some rational underpinning to support the legal conclusion of obviousness,” the rejected claims are allowable in accordance with MPEP 2143.01(IV).

Applicants respectfully submit that absent improper hindsight, there is no motivation present in the references to combine the features of the references and even if the features of the cited references are combined they do not teach all of the limitations of the independent claims of the present application.

Moreover, the combination of the references would provide marine seismic survey system comprising multiple marine cables, the marine cables comprising multiple pressure sensors mechanically maintained at a fixed orientation in which the relative planar position in the horizontal plane of points on different streamers is determined by acoustic transceivers on the different marine cables, a system that does not in any way describe the features of the present application, and more importantly does not teach a system in which the angle of rotation of pressure sensors is determined or the vertical pressure gradient corrected for the rotation angle. Furthermore, the Jubinski reference teaches that there has been a long felt need in the industry for addressing relative sensor motion, angular rotation of sensors with respect to one another, and this has always been addressed, prior to the present application, by mechanical means (*see* Jubinski, Abstract and Col. 1, lines 40-64); which repeated addressing of the issue in a mechanical manner obviates a conclusion of obviousness with regard to the amended claims of the present application.

Finally, the features of the present application of determining the angular rotation of the pressure sensors allows for measurement of only the vertical component of the seismic wavefield. The synergistic effect of using electromechanical transducers that are configured to generate signals indicative of an orientation of the plurality of pressure sensors in the cable so that the vertical pressure gradient can be independently measured is that the system of the present application is less sensitive to crossline seismic interference and the like, a synergistic effect that is not addressed in the cited references.

The only apparent reason the Patent Office could have for trying to combine these two disparate references is to try to invalidate Claim 10. It should be noted that the impropriety of using an applicant's claim as a roadmap and motivation for combining references is well-known.

Applicants respectfully submit that absent improper hindsight, there is no motivation present in the references to combine the features of the references and even if the features of the cited references are combined they do not teach all of the limitations of the independent claims of the present application. Moreover, the combination of the references would provide marine seismic survey system comprising multiple marine cables, the marine cables comprising multiple pressure sensors mechanically maintained at a fixed orientation in which the relative planar position in the horizontal plane of points on different streamers is determined by acoustic transceivers on the different marine cables, a system that does not in any way describe the features of the present application, and more importantly does not teach a system in which the angle of rotation of pressure sensors is determined. Furthermore, the Jubinski reference teaches that there has been a long felt need in the industry for addressing relative sensor motion, angular rotation of sensors with respect to one another, and this has always been addressed, prior to the present application, by mechanical means (see Jubinski, Abstract and Col. 1, lines 40-64); which repeated addressing of the issue in a mechanical manner obviates a conclusion of obviousness with regard to the amended claims of the present application.

CONCLUSION

In view of the foregoing, Applicants believe all claims now pending in this Application are in condition for allowance. The issuance of a formal Notice of Allowance at an early date is respectfully requested.

In the event that a fee or refund is due in connection with this Amendment, the Commissioner is hereby authorized to charge any underpayment or credit any overpayment to Deposit Account No 19-0615. If the Examiner believes a telephone conference would expedite prosecution of this application, please telephone the undersigned.

Respectfully submitted,

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